



Basics of an Emission Inventory Report

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Air Quality Workshop

February 4th, 2016

Tulsa, OK

Layout of an Inventory

- **Company** – OU Health Sciences Center
- **Facility** – OKC Campus Services
- **Emission unit(s) with release point(s)** – Boiler No. 4 & Boiler No. 4 Stack
- **Process(es)** – SCC 10300602 = External Combustion Boilers, Commercial/Institutional, Natural Gas, 10-100 million Btu/hr
- **Emission(s)** – CO, NO_x, PM-10, PM-2.5, SO_x, Total VOC, Hexane



COMPANY INFO AND FACILITIES

DEQ Contact Info [Help with this page](#)

Company ID: 9027 Name: ABC MANUFACTURING

Street: 1234 W 5TH City: PODUNK State: OK Zip: 73737

Phone: (555) 555-5555 Fax: _____

Responsible Officer: _____ Update Company Data

Select Facility to Edit:

- ABC FACILITY 9027

Inventory Submittal Status
Inventory is incomplete

After all 2008 data has been entered, it must be verified complete before proceeding.

Verify Inventory completeness

ABC MANUFACTURING

Company > Facility > [Help with this page](#)

FACILITY: ABC FACILITY 9027 Facility ID: 9027 Status: Active

Street: 1234 W 5TH City: PODUNK State: OK Zip: 73737 Phone: (555) 555-5555

NAICS: 331210 SIC: 3317 Memo: _____

Dunn & Brad: N/A TRI ID: N/A

Turn Around Document Facility Contact Update Facility Data

County: Tulsa UTM Horiz: 235.25 Latitude(N+): 36.124440

Sublocator: Section: 17 UTM Vert: 4001.17 Longitude(W-): -95.940280

Township: 19N Range: 13E UTM Zone: 15

Facility Points: Select point to edit

- 1 Vapor Degreaser
- 2 Natural Gas Burner

View Point Data Add New Point

Facility Permits: 2009-927-0 iss. 1/1/2009

Company > Facility > Point > [Help with this page](#)

ABC FACILITY 9027

Point ID: 90272 Seq #: 2 Point Name: Natural Gas Burner Status: Active UTM Horiz: 235.25 UTM Vert: 4001.21

Notes: _____

Updated? NO

Changes to Point Data

Help with adding new stack

Stack ID: 90272 Seq #: 1 Stack Name: Burner stack Dia(ft): 12 Dia(in): 0.50

Stack Type: Vertical Gas Exit: 47 Flow(acft): 12 Temp (F): 690

Save Changes to Stack Data Add New Stack Updated? NO

Processes

- 39000699 Industrial Processes, Natural Gas, General

View Process Data Add New Process

Company > Facility > Point > Process > [Help with this page](#)

Natural Gas Burner

Point ID: 90272 Point Name: Natural Gas Burner Is Process Data Confidential? NO

Process ID: 902720 SCC: 39000699 Process Description: Industrial Processes, In-process Fuel Use, Natural Gas, General

Process Material: Natural Gas Units: 1000 Standard Cubic feet

Material I/O: Used (Input) Maximum Hourly: 0.10 Typical Daily: 1.70 Actual Annual: 0

MACT: Description: NA Status: NA

Temporal Operating Information: Daily Start time: 7:00 AM Hours/Day: 12 Days/Week: 5 Weeks/Year: 52 Actual Hours/Year: 0

Daily Stop time: 7:00 PM Seasonal fractions: Spring: 0.25 Summer: 0 Fall: 0.25 Winter: 0.25

Boilers and Turbines Only: Design Capacity: 0 MMBTU/hr

Electrical Generating Units Only: Nameplate Capacity: 0 MMBTU/hr

Sulfur: 0 % ASH: 0 %

Add New Pollutant Save Changes to Process Data Updated? NO

Company > Facility > Point > Emission > [Help with this page](#)

Pollutant ID: 191060 1350 Pollutant Description: Carbon Monoxide CAS: 630080 Actual Emissions: 0 Tons

Calculation Method: Mass Balance Emission Factor: 0 Factor Numerator Units: Information required

Factor Denominator Units: Information required

Control 1: Uncontrolled Efficiency, Control 1: 0 Permit/Rule Limit: 22 Tons/yr Excess Emissions: 0 Tons

Control 2: Uncontrolled Efficiency, Control 2: 0

Save Changes to Pollutant Data Updated? NO

Company Page

Facility Page

Emission Unit Page

Process & Emissions Page

Company/Facility Information

ID		Name		
<input type="text" value="9022"/>		<input type="text" value="ABC MANUFACTURING"/>		
Street		City	State	Zip
<input type="text" value="1234 W 5TH"/>		<input type="text" value="ANYTOWN"/>	<input type="text" value="OK"/>	<input type="text" value="73737"/>
Phone		Fax		
<input type="text" value="(555) 555-5555"/>		<input type="text"/>		
<input type="button" value="Responsible Official & Additional Submission Contact"/>		<input type="button" value="Update Company Data"/>		Emissions Inventory General Ins Redbud Online Help

FACILITY <input type="text" value="ABC FACILITY 9022"/>		Facility ID <input type="text" value="90221"/>	Status <input type="text" value="Active"/>				
Street		City	State	Zip	Phone		
<input type="text" value="1234 W 5TH"/>		<input type="text"/>	<input type="text" value="OK"/>	<input type="text" value="73737"/>	<input type="text" value="(555) 555-5555"/>		
NAICS	<input type="text" value="331210"/>	Memo from DEQ:					
SIC	<input type="text" value="3317"/>	Memo from Facility:					
TRI ID	<input type="text" value="N/A"/>						
<input type="button" value="Generate Turnaround Document"/>		<input type="button" value="Download Facility Turnaround"/>		<input type="button" value="Facility Contact"/>		<input type="button" value="Save Changes to Facility Data"/>	

Air Permit Memorandum

- Includes:
 - Initial application data
 - Description of operations & processes
 - Lists emission units
 - Emission calculations & references
 - Can list acceptable Emission Factors



PERMIT

**AIR QUALITY DIVISION
STATE OF OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY
707 N. ROBINSON STREET, SUITE 4100
P.O. BOX 1677
OKLAHOMA CITY, OKLAHOMA 73101-1677**

Permit Number: 2012-1436-O

But Beware !

- The permit may list some processes as:

Insignificant
De Minimis

The permit is not the final word for determining what should be in an emissions inventory

Emission Units

What is an emission unit?



What emission units do I report?

- Normally, the emission units listed in your permit

EUG 2 Package Boilers

Boiler name	EP #	<u>Seq #</u>	Heat Input and Manufacturer	Construction Date
B	10277	1	157 MMBTUH Trane-Murray	1974
C	10278	2	177 MMBTUH Combustion Engineering	1975

EUG 3 NSPS Boiler

Boiler name	EP #	<u>Seq #</u>	Heat Input and Manufacturer	Construction Date
D	102XX	24	212 MMBTUH Nebraska Boiler	1995

- However, an emission unit may be insignificant for permitting, but may not be insignificant for emissions inventory reporting
- Are emissions above the reporting threshold?
- Contact us if you are unsure!

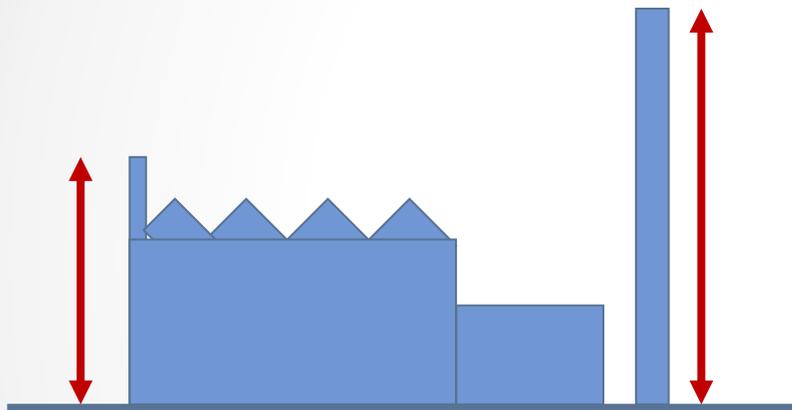
EU ID	Seq #	Emission Unit Name	Status
22687	1	36.2 MMBTUH Clever Brooks Boiler (EUG-1) X	Operating v
Notes from ODEQ:		Latitude 36.12	

- Operating – emission unit operated at any point in the calendar year.
- Temporarily Shutdown – emission unit did not operate at all during the calendar year, but may restart at sometime in the future.
- Permanently Shutdown – select this status if an emission unit has been physically removed or permanently removed from service.

Emission Release Points

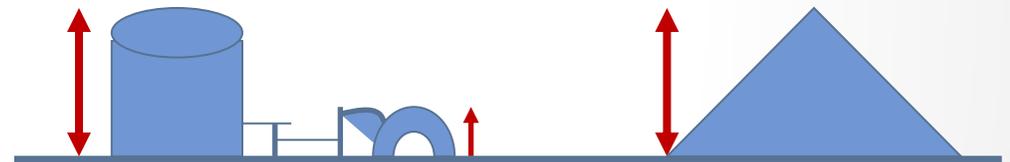
Types of Emission Release Points

Stack



Height Above
Grade

Fugitive



Pipe work

Storage Tank

Minerals

Stack Parameters



ERP ID	Seq #	Stack/Emission Release Point Name	Stack/Release Point Type	Status	Fugitive Area (sq ft)	Fugitive height(ft)
372	1	Stock Pile	Fugitive	Operating	114	40

<< < 1 > >> of 1

 Updated? NO

ERP ID	Seq #	Stack/Emission Release Point Name	Height (ft)	Dia (ft)	Temp (F)
373	1	W. J. MORTON Concrete Blocks Plant (E10) Stack	10	3.00	450

Stack Release Point Type	Status	Gas Exit Velocity (ft/min)	Flow (scfm)	Provide one or both of these two fields.
Vertical	Operating	14.10	700	

<< < 1 > >> of 1



Report parameters in the specified units:
<http://www.deq.state.ok.us/aqdnew/emissions/SCFMvsACFM.PDF>

Stack Parameters



ERP ID	Seq #	Stack Emission Release Point Name	Stack Release Point Type	Status	Fugitive Area (sq ft)	Fugitive height (ft)
172		Stock Pile	Fugitive	Operating	114	40

ERP ID	Seq #	Stack/Emission Release Point Name	Height(ft)	Dia(ft)	Temp (F)	Stack/Release Point Type	Status	Gas Exit Velocity (ft/second)	Flow(acfm)
373	1	36.2 MMBTUH Clever Brooks Boiler (EUG-1) stack	16	0.66	450	Vertical	Operating	34.10	700

Provide one or both of these two fields.



Report parameters in the specified units:

<http://www.deq.state.ok.us/aqdnew/emissions/SCFMvsACFM.PDF>

Emission Process Information

Emission Processes

- What information will I need?
 - Source Classification Code (SCC)
 - Process Material
 - Process Rates
 - Hours each process ran
 - Design capacity (if applicable)
 - Fuel data (if applicable)

Process Material, Rate & Hours

EU ID	22756	Emission Unit Name	ENG 1 203 hp Cat 3306TA 4SRB S/N: 900021			Is Process Data Confidential?	N
Process ID	38177	SCC	20200253	Process Description			
		Internal Combustion Engines,Industrial,Natural Gas,4-cycle Rich Burn					
Process Material Natural Gas Material I/O Used (Input)		Process Rates: Maximum Hourly: 0.0010 Typical Daily: 0.0350 Actual Annual: 0 Units: Million standard cubic feet			Combustion Processes Design Capacity: 203 Units: HORSEPOWER		
Hours/Day: 24 Days/Week: 0 Weeks/Year: 52		Actual Hours/Year 0			Fuel Data for Combustion Processes Fuel Heat Content: 1020 Units: MMBTU/MMSCF % Sulfur: 0 % Ash: 0		
Seasonal fractions: Spring: 0.25 Summer: 0.25 Fall: 0.25 Winter: 0.25		Add New Pollutant		Save Changes to Process Data		Updated? NO	

Process Material, Rate & Hours

EU ID	22756	Emission Unit Name	ENG 1 203 hp Cat 3306TA 4SRB S/N: 900021			Is Process Data Confidential?	N	
Process ID	38177	SCC	20200253	Process Description			Internal Combustion Engines,Industrial,Natural Gas,4-cycle Rich Burn	
Process Material		Process Rates:			Combustion Process			
Natural Gas		Maximum Hourly: Typical Daily: Actual Annual:			Design Capacity Units			
Material ID		Units: Million standard cubic feet			Fuel Data for Combustion Process			
Fuel Input		Actual Hours/Year			Fuel Heat Content Units			
Hours/Day	Days/Week	Weeks/Year	Spring: 0.25 Summer: 0.25 Fall: 0.25 Winter: 0.25			N Sulfur N Ash		
Add New Pollutant		Save Changes to Process Data			Updated?			

Process Material, Rate & Hours

Process ID: 10177 MCC: 1000023 Process Description: Internal Combustion Engines, Industrial Natural Gas, 4 cycle Rich Burn

Process Material
Natural Gas ...

Material I/O
Used (Input) v

Process Rates:
Maximum Hourly: 0.0010 Typical Daily: 0.0350 Actual Annual: 0

Units: Million standard cubic feet ...

Combustion Process
Design Capacity: 200 Units: 1000000000

Fuel Data for Combustion Process
Fuel Heat Content: 100 Units: 1000000000

N Sulfur: 0 N Ash: 0

Hours/Day: 24 Days/Week: 7 Weeks/Year: 52 Actual Hours/Year: 9

Seasonal Fractions: Spring: 0.25 Summer: 0.25 Fall: 0.25 Winter: 0.25

Add New Pollutant Save Changes to Process Data Updated?

Process Material, Rate & Hours

Business Unit Name: ENG 1 201 by Cal EIR/TA 4888 v.1: 9/10/21

Process ID: 10177 MCC: 10000213 Process Description: Internal Combustion Engines, Industrial Natural Gas, 4 cycle Rich Burn

Process Material	Process Rates:			Combustion Process
Natural Gas	Maximum Hourly:	Typical Daily:	Actual Annual:	Design Capacity Units
Material ID	0.000	0.000	0	200
Load Input	Units: British standard cubic feet			Fuel Data for Combustion Process
	Hours/Day: 24 Days/Week: 0 Weeks/Year: 52 Actual Hours/Year: 0			Fuel Heat Content Units
	Seasonal fractions: Spring: 0.25 Summer: 0.25 Fall: 0.25 Winter: 0.25			% Sulfur % Ash

Add New Pollutant Save Changes to Process Data Updated?

Process Material, Rate & Hours

Business Unit Name: ENG 1 201 Ig Cal (EMTA) (MSB) (N) 90021
Process ID: 0000253 MCC: Process Description: Internal Combustion Engines, Industrial Natural Gas, 4-cycle Rich Burn

Process Material	Process Rates:		
Material ID	Maximum Hourly:	Typical Daily:	Actual Annual:
Natural Gas	0.0010	0.0010	0
Material ID	Units: Million standard cubic feet		

Hours/Day: 24 Days/Week: 7 Weeks/Year: 52 Actual Hours/Year: 0

Seasonal fractions: Spring: 0.25 Summer: 0.25 Fall: 0.25 Winter: 0.25

Buttons: Add New Pollutant Save Changes to Process Data Updated?

Combustion Processes

Design Capacity Units

203 HORSEPOWER

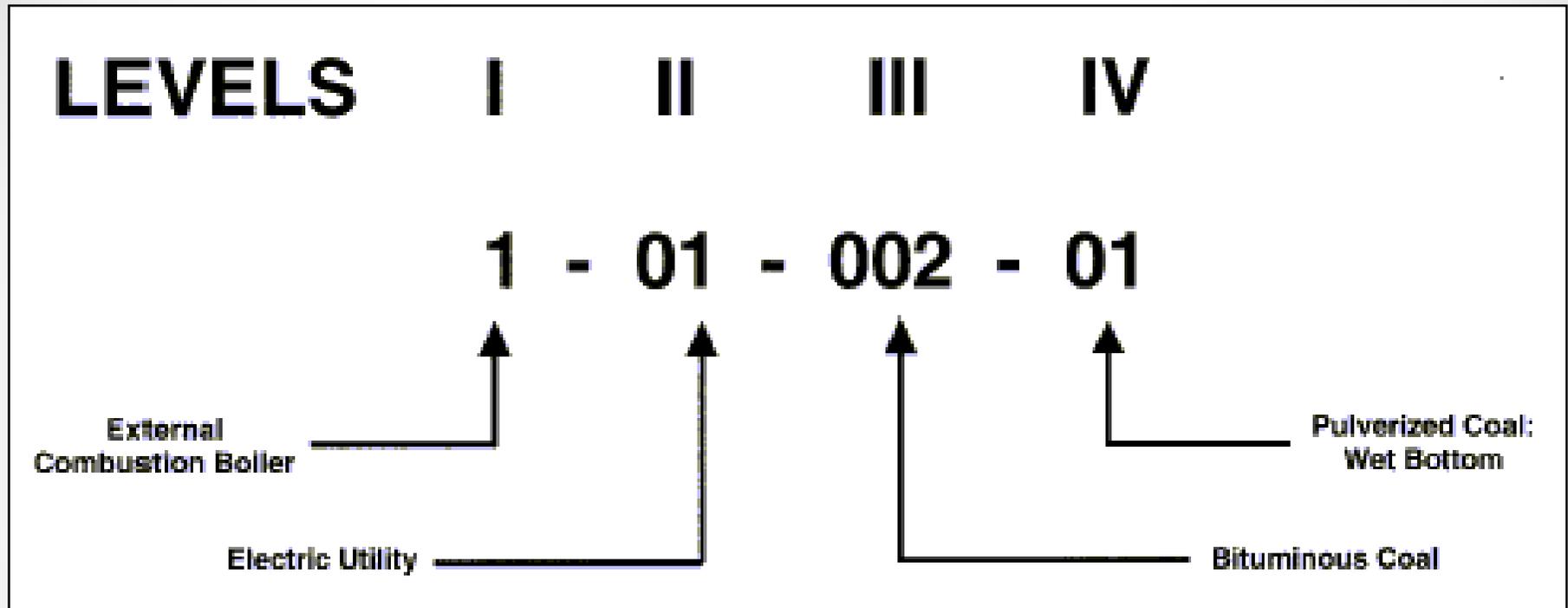
Fuel Data for Combustion Processes

Fuel Heat Content Units

1020 MMBTU/MMSCF

% Sulfur: 0 % Ash: 0

Source Classification Code (SCC)



- The SCC provides a systematic description of the process
 - Be as specific as possible
 - Avoid miscellaneous processes (xxxxxx99)

Emissions Information

Emissions

- What information will I need?
 - What pollutants to report
 - Method for calculating the emission amounts (e.g., emission factors)
 - Capture efficiency & control efficiency (if applicable)
 - Amount of actual emissions
 - Permit or rule limit (if applicable)
 - Excess emissions (if applicable)

Emissions

Company >	Facility >	Emission Unit >		
Logout	Pollutant ID	Pollutant Description	CAS	
162804	1774	* PM-10 (All Particulate Matter <10 microns)		
Calculation Method	Emission Factor	Factor Numerator Units		
AP-42 Factors	0.019410	Pounds		
Reference		Factor Denominator Units	Million btus	
WebFire		Method/Factor includes Control Efficiency?		<input type="checkbox"/>

- Report Regulated Air Pollutants (RAPs) – pollutants regulated by statute, rule, regulation or permit
- Not sure what pollutants come from your process?
 - Look at your permit
 - Contact your manufacturer or supplier
 - Try entering your SCC into EPA's WebFIRE database

What is an Emission Factor?

An emission factor (E.F.) relates the quantity of a pollutant released with an activity or process rate associated with the release of that pollutant.

OAC 252:100-5-2.1(d) Method of calculation.

“The best available data at the time the emission inventory is or should have been prepared shall be used to determine emissions.”

Emission Factors can be found in your Air Permit:

Potential Emissions From EUG 2 and EUG 3

Source/ ID#	Hourly Throughput	Pollutant	Emission Data	Emissions	
				Lb/hr	TPY
Unit 1 B-02-1	5,131 MMBTU or 306.22 tons	PM/PM ₁₀	0.036 lb/MMBTU (a)	513 (b)	2,247 (c)
		VOC	0.060 lb/ton (d)	18.4	80.5 (c)
		CO	0.17 lb/MMBTU (e)	872	3,820
		SO ₂	(f)	(f)	14,525 (f)
		NOx	0.465 lb/MMBTU (g)	3592 (b, g)	15,732 (c, g)
		Fluorides	0.0019120 lb/MMBTU (h)	9.81	43.0 (c)
		Beryllium	0.0002090 lb/MMBTU (h)	0.005 (n)	0.02 (c)
		Lead	0.0000160 lb/ton (h)	0.005	0.02 (c)
		Mercury	0.04335 lb/hr (o)	0.048	0.211 (c)

- Make sure you are using the most current emission factors
- Has there been a more recent stack test?

E.F. & Calculation Method

Company >	Facility >	Emission Unit >		
Logout	Pollutant ID	Pollutant Description	CAS	
162804	1774	* PM-10 (All Particulate Matter <10 microns)		
Calculation Method	Emission Factor	Factor Numerator Units		
Permit Factors	0.036	Pounds		
Reference		Factor Denominator Units		
2014-773-O, Section IV, Table 1		Million btus		
		Method/Factor includes Control Efficiency?		<input checked="" type="checkbox"/>

- Does the E.F. include the reduction due to control equipment?
- Update the Reference field to show where you obtained an E.F.

No Specific Emission Factor

For modeling software, complex mass balance calculations, formulas & CEMS enter:

Emission Factor	Factor Numerator Units	*N/A-Formula, Software, or CE ▾
0	Factor Denominator Units	*N/A-Formula, Software, or C ...

Common Examples:

TANKS, Vasquez-Beggs Equation, GRI-GLYCalc, & LANGEM



Emission Controls

- Control equipment is reported for each individual pollutant



Emissions Unit	Manufacturer	Size/Rating
EP-3 Water Heater	Kemco	15 MMBTUH
EP-2 Water Heater	Kemco	12 MMBTUH
EP-1 Boiler	Williams & Davis	125 HP/ 5.325 MMBTUH
EP-4 Boiler	Superior	200 HP/ 8.40 MMBTUH
Live Receiving System Baghouse	MAC Equip., Inc.	99.9% eff. @ 7,000 cfm

Control 1



Control 1 Efficiency (%)

Control 2



Control 2 Efficiency (%)

Capture Efficiency (%)

Save Changes to Pollutant Data

Actual Emission Amount

- **"Actual emissions"** means the total amount of any regulated air pollutant actually emitted from a given facility during a particular calendar year, determined using methods contained in OAC 252:100-5-2.1(d).
- This Should Include:
 - ✓ Regular operations
 - ✓ Startup, Shutdown, Maintenance (SSM)
 - ✓ Excess emissions

The screenshot shows a form with several input fields and checkboxes. A red rounded rectangle highlights the 'Actual Emissions' section, which includes a text input field containing '0' followed by 'Tons' and a note '[Includes All Excess Emissions]'. Below this is a checkbox labeled 'Trace (<.001 TPY)'. At the bottom of the form, there are two more rows: 'Excess Emissions' with a text input field containing '0' and 'Tons', and 'Permit/Rule Limit' with a text input field containing '28.54' and 'Tons/yr'.

<input type="checkbox"/>	Trace (<.001 TPY)		
<input type="checkbox"/>	Excess Emissions	<input type="text" value="0"/>	Tons
<input type="checkbox"/>	Permit/Rule Limit	<input type="text" value="28.54"/>	Tons/yr

Excess Emissions

Report quantifiable emissions that are in excess of a permit limit, annual or hourly

The screenshot shows a reporting interface with the following data:

Actual Emissions	
8.465	Tons
[Includes All Excess Emissions]	
<input type="checkbox"/>	Trace (< .001 TPY)
<input type="checkbox"/>	
Excess Emissions	0.124 Tons
Permit Rule Limit	11.74 Tons/yr

Red arrows point from the callout boxes below to the 'Actual Emissions' value (8.465), the 'Excess Emissions' value (0.124), and the 'Permit Rule Limit' value (11.74).

Total actual emissions of 8.465 tons includes 0.124 tons of excess emissions

0.124 tons represents total mass of all hourly limit exceedances in the reporting year

The annual limit of 11.74 tons has not been exceeded

“Emission Inventory” - a compilation of all point source, storage and process fugitive air emissions for all regulated air pollutants at a given facility.

Questions?